"PHENOTYPIC CHARACTERIZATION OF BACTERIAL ISOLATES IN URINE SAMPLES FROM POST-RENAL TRANSPLANT RECIPIENTS AND GENOTYPING OF MULTIDRUG RESISTANT ISOLATES IN A TERTIARY CARE HOSPITAL"

ABSTRACT

BACKGROUND:

Renal transplantation has evolved as the preferred mode of treatment for patients with End-Stage Renal Disease. Despite the fact that considerable advances have been achieved in the field of organ transplantation and immunosuppression for renal transplantation, post-renal transplantation urinary tract infection (UTI) remains a major threat to the graft function and thus the survival of the graft and the patient. Hence, this study is aimed at identifying the bacterial pathogens causing urinary tract infection in post-renal transplant recipients and to determine the antimicrobial resistance among the bacterial isolates phenotypically and to genotypically identify antimicrobial resistance causing gene in the multidrug resistant bacterial isolate.

MATERIALS AND METHODS:

After obtaining approval from Institutional Ethics Committee, Madras Medical College and Rajiv Gandhi Government General Hospital(RGGGH), Chennai and informed consent from all the patients, the study was conducted between April 2016 to March 2017. A total of 48 patients who underwent Renal Transplantation at RGGGH between April 2016 to December 2016 were included in the study. Three Clean-Catch Mid-Stream Urine (CCMSU) samples were collected from every patient during their three subsequent visits post transplantation (i.e., on 10^{th}day, 1^{st} month and 3^{rd} month) and hence, a total of 144 urine samples were processed. All urinary samples were subjected to macroscopic examination, microscopic examination, culture and antimicrobial susceptibility testing as per Standard Microbiological Operative Procedures. Phenotypic assessment of antimicrobial resistance

pattern among the bacterial pathogens isolated and Genotypic identification of antimicrobial resistance causing gene among the multidrug resistant bacterial isolates were performed.

RESULTS:

Among 48 patients included in the study, 40(83.3%) were males and 8(16.7%) were females. The mean age was 32.7 years. The incidence of UTI among the post-renal transplant recipients in this study was 26(18.1%), of which the incidence of UTI among patients during I visit, II visit and III visit were 6(23.1%), 12(46.2%) and 8(30.7%) respectively. The incidence of UTI was higher in females (25%) than males (16.7%) and was found that majority 22(84.6%) of post-renal transplant recipients with UTI did not present with the symptoms of UTI. Also, recipients who received the transplant from a deceased donor had a higher propensity 18(69.3%) to acquire UTI.

In this study, Gram-negative bacteria were isolated more frequently 22(84.6%) and *Acinetobacter baumannii* 8(30.8%) being the predominant bacterial isolate. Among the Gram-negative bacteria isolated, 15(68.2%) possessed enzymes causing antimicrobial resistance patterns. 3(20%) were ESBL producers, 4(26.7%) were AmpC betalactamase producers, 6(40%) were co-producers of ESBL and AmpC betalactamase enzymes and 2(13.3%) were Carbapenemase enzyme producers and among the *Enterococcus species* isolated in this study, 1(25%) isolate was Vancomycin Resistant *Enterococci*.

On performing conventional PCR, all the ESBL producers expressed $bla_{CTX\text{-}M}$ gene, all the AmpC betalactamase producers expressed bla_{CMY} gene, the Carbapenamase producing *A.baumannii* expressed $bla_{OXA\text{-}23}$ gene and Vancomycin Resistant *Enterococci* expressed *VanA* gene.

CONCLUSION:

Post-renal transplant recipients are highly susceptible to infections owing to the net state of immunosuppression. Urinary tract infection being the most common infection among

the post-renal transplant recipients, they were not always symptomatic and the recipients who received transplant from a deceased donor had a higher propensity to UTI. *Acinetobacter baumannii* was the most common bacterial pathogen isolated and all were multidrug resistant and 25% were Carbapenemase producers. Urinary tract infections by multidrug resistant bacterial pathogens are potentially life-threatening causing systemic infections like bacteraemia and hence loss of the graft function.

Hence, a high index of suspicion of Urinary tract infection, regular follow up of post-renal transplant recipients and education on basic infection prevention measures are highly essential for better graft survival, overall success of the transplant and thus assuring a better quality of life for post-renal transplant recipients.

Keywords: Renal transplantation, Urinary tract infection, multidrug resistant bacterial pathogens, Post-renal transplant recipients.